

# The Invention and Development of the Dial Telephone: The Contribution of Three Lindsborg Inventors

by Emory Lindquist

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*NOTE: The numbers in brackets refer to endnotes for this text.*

THE Smoky Valley in central Kansas, peopled by Swedish immigrants in the 1860's, has made a distinctive contribution to the best tradition of fine music and art. The Lindsborg "Messiah" chorus and the great artistry of the late Birger Sandzén have greatly enriched the cultural life of the Plains area. This valley also furnished the setting for the careers of three people of Swedish ancestry, whose creative ability was turned into inventions. They were two brothers, John and Charles J. Erickson, and Frank A. Lundquist. These men shared their talent primarily in making substantial contributions to the invention and development of the dial telephone. [1]

The story had its beginning on the Erickson homestead, three miles northeast of Lindsborg, where Anders Erickson and his wife, Anna Maria, settled in 1869. They came in April of that year from Värmland, Sweden, to share in founding the Lindsborg community. [2] Anders, the father, had unusual talent as a mechanic; he was recognized in the entire area for his skill as a blacksmith, and as a fine craftsman, working in metal and wood. The sons watched their father perform difficult tasks with simple equipment. With the passing of the years, a shop measuring 14 by 9 feet was provided for the brothers, adjoining that of their father. Here they dreamed, planned, and worked.

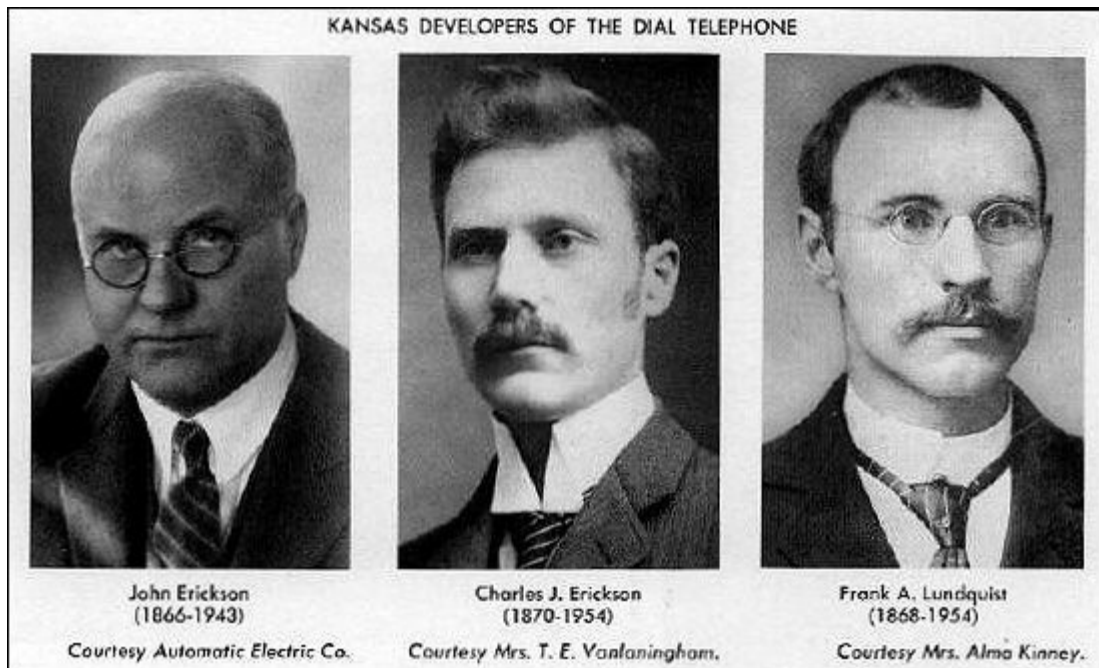
In an account written by Charles Erickson, the younger of the two brothers, is found a description of their early activities and their relationships with Frank A. Lundquist, a friend and associate. [3] The brothers knew no limits to their plans for inventions. Charles pointed out that their first project was to solve the perpetual motion problem! They worked on it for three years, but were forced like countless others to abandon it. They next turned toward the invention of a "horseless buggy" to be driven by gas explosion. The engine functioned, but it did not generate adequate power. The creative spirit continued to challenge

the youthful inventors as described by Charles:

John and I stuck to the old game and were busier than ever. Our workshop on the farm was a busy place day and night during the Winter months and whenever opportunity presented itself in the Summer, and the dusky kerosene lamp gleamed until midnight almost every night. At the time we were struck by the automatic brain storm. We had many irons in the fire, a printing telegraph, a new principle for a phonograph to store the sound without mechanical engraving and an automatic piano player. We had a connection in Denver that financed the work as far as paying for the material and patents, if we should get that far. The tools and machinery we made ourselves, such as lathes, gear cutting machines, and drill presses. [4]

The careers of the Ericksons and Lundquist were influenced greatly by the residence which the latter established in Chicago, where he worked for the Chicago Telephone Company for six months. Lundquist was interested in an invention relative to the telephone. The development of his ideas based upon a visit to a hotel in Salina, where he observed the operation of the telephone exchange, has been described by him as follows: "The idea occurred to me then that some day those connections would be made automatically. I loitered around the hotel lobby and made a regular pest of myself examining that switchboard and revolving that thought in my mind. Then I went back home and began to figure and tinker away with the idea." [5] Lundquist had a little shop in the loft of an old red barn at his home in Lindsborg, where he tried to translate his ideas into reality. He subscribed to one scientific magazine, whose contents he studied carefully. [6]

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Lundquist, according to Charles Erickson's account, continued to emphasize his interest in an automatic telephone and told the brothers that someone in Chicago was trying to develop this system. The basic patent on the telephone was obtained by Alexander Graham Bell in 1876. Three years later, in 1879, an automatic switching system was devised by David Connolly, T. A. Connolly, and J. T. McTighe, although it was not practical. The reference by Lundquist was undoubtedly to the device created by Almon B. Strowger in 1889, which developed into a successful automatic switching system. On November 3, 1892, the first exchange, which accommodated about 75 subscribers, was opened at La Porte, Ind. [7]

The response of the Erickson brothers to the possibility of developing an automatic telephone is recorded by Charles as follows:

After John and I thought the problem over for a few minutes we saw that it could be done on somewhat the same principle as the printing telegraph we had underway. After we had explained to Frank how we saw it possible, he was up in the air with enthusiasm and said that if we could produce such a system it would be a gold mine and worth more than all the inventions we were working on. He became very insistent that we tackle the problem and lay all our work aside for the time being .... This happened about the 1st of November, 1892, and by the New Year we had a model completed with a capacity of one hundred contacts or lines. We also had a calling device finished to operate the switch with. [8]

Financial support for the new project was secured by Lundquist from Gust and John Anderson, grain dealers in Lindsborg and Salina. The kerosene lamp burned far into the night in the small shop on the Erickson homestead near Lindsborg as the

invention was redesigned and perfected.

The time had come when the trio decided that their automatic telephone should be presented to the world. The place chosen was Chicago. On March 14, 1893, Carl O. Pearson, a friend and neighbor, brought the Ericksons and their precious invention in a spring wagon to the Lindsborg railroad station for the beginning ,of the fateful journey to. Chicago. Upon arrival in Chicago, an old store front was rented as a workshop and equipped with necessary tools and machinery, including a foot-power lathe. Money was scarce and other employment could not be obtained. This was a time of real hardship for the eager Lindsborg inventors. A group of Chicago Swedes became interested in the proposed automatic telephone, but this was a precarious venture, and adequate financial support was not available.

The pattern changed, however, toward the end of 1893, when two men, A. E. Keith and A. B. Strowger, contacted the Lindsborg inventors and requested a conference with the objective of discussing the automatic telephone. Charles Erickson has described the situation as follows:

Previous to our time in this field, about a year earlier, a company was organized in Chicago for the purpose of developing an automatic telephone system, namely the Strowger Automatic Telephone Exchange Company, and as a last resort we invited this company to look into what we had developed. As for having anything in the shape of an automatic telephone system they were in much worse shape than we were. They realized their own weakness and were as close to throwing up the sponge as we were, so they gladly and quickly accepted our invitation, and the following morning two of the company's engineers appeared on the scene and introduced themselves as Messrs. A. E. Keith and A. B. Strowger. After a couple of hours discussion and exhibiting they were pretty well spirited up with enthusiasm and admitted that what we had was quite a bit further advanced than their own. The result was that they made us a proposition to join their company .... This took place at the close of the year 1893, and so ended our first year of pioneering work in quest for gold on the inventor's rocky road on unexplored ground. Up to this time we had designed three types of switches, two in Chicago and one in Kansas. [9]

When the Lindsborg. inventors joined the Strowger Company, the latter had a small exchange at La Porte, Ind., which required five lines to every telephone. The automatic telephone was advertised at that time as the "girl-less, cuss-less, and wait-less telephone." The Erickson's invention required only two lines. Strenuous efforts were made to improve the system. Charles has pointed out that the first product was a system with one hundred line capacity, but soon this proved inadequate. The capacity was increased substantially from time to time. The inventors worked steadily and imaginatively. In 1895 application was made for a patent, which became No. 638,249, issued to A. E. Keith and the Erickson brothers in 1899. It recognized a type of switch quite similar to the modern step-by-step switch. [10]

The most important developments with which the Erickson brothers

were associated received the finishing touches in the summer of 1896. The future of the automatic telephone was limited by the number of lines required. Keith and the Ericksons worked steadily on a new system "employing the trunking or transfer principle in order to remove the limitation on the size of an automatic exchange imposed by the necessity of multiplying all of the subscribers lines to each switch." [11] The patent for the 1,000-line trunking system by Keith and Ericksons was applied for on June 23, 1897, and Patent No. 672,942 was granted on April 30, 1901. Charles has described the background factors as follows:

John and I had long before this time decided on the one and only principle to follow to success. We realized at the start how impractical and impossible the principle was that we had started on and that all others had followed in their attempt to develop an automatic system. The second principle entertained by John and myself remained quite hazy for a long time. The problem of dispersing the mist was hard and seemed impossible at times, but the hobby for unsolved problems still lived in us and the will that always finds a way drove us on, and as the work went on a spark now and then dislodged some of the doubt and between hope and despair we paved the way to the crowning day of our labor. Three years passed by before we saw the way clear to give the principle a test and on June 6, 1896, we put the finishing touch on the most important model ever built in the field of automatic telephone engineering, and after a few demonstrations, the work was pronounced a success. The doors were now open to a field of great possibilities of which the boundaries have not yet been explored. [12]

Lundquist, who had left the Strowger company in 1896, received Patent No. 776,524 in 1904 for the automatic selection of an idle trunk. [13]

The most dramatic contribution of the Ericksons in telephony is associated with the invention and development of the dial telephone. Application for the patent was made by Keith and the Ericksons on August 20, 1896, and Patent No. 597,062 was granted on January 11, 1898. The dial method was based upon a finger wheel dial instead of the push buttons, which were cumbersome and impractical. The dial method, with the switching and trunk systems, provided full access to the vast resources of a telephone exchange. R. B. Hill, an authority in telephony, has described this important development as follows: "Dialing a number wound up a spring whose tension, when the finger was withdrawn, caused the dial to return to its normal position. The return rotation was limited to a moderate speed by an escapement mechanism, and, during the return, the required number of circuit interruptions took place to control the movement of the central office

apparatus." [14] C. M. Candy, chief patent attorney for Associated Electric Laboratories, Inc., at a testimonial dinner for Charles in Chicago in December, 1939, described the invention: "This dial was circular like the present dial but instead of holes, it had lugs on a finger plate, which were finger 'holds' rather than holes." [15] This invention was a distinctive and unique development; the principle has not been superceded. The inventors from the Smoky valley, who had always placed themselves on the line of discovery, saw a further realization of their hopes and dreams.

The Erickson brothers continued their association with the Strowger Automatic Telephone Exchange Company until 1901, when the Automatic Electric Company was organized at Chicago. They became development engineers and remained with that organization until time of retirement. The handful of men, including A. B. Keith, Almon B. Strowger, Charles J. and John Erickson, and Frank A. Lundquist, the last three from Lindsborg, shared in the development of a great industry. The Automatic Electric Company, Chicago, now employs 6,000 men and women. [16] Strowger-type equipment serves more telephones in the United States and throughout the world than all other automatic systems. The system was introduced abroad for the first time in 1898 by the use of a 200-line switchboard in London. A 400-line system was established in Berlin in 1899. The system was later installed in Canada, Cuba, Australia, Argentina, Hawaii, New Zealand, India, and South Africa, and elsewhere in the Far East and Europe. [17] Leslie H. Warner, a graduate of Wichita High School East and the University of Wichita, is president of the Automatic Electric Company.

The Erickson brothers and Lundquist established an enviable pattern in the field of inventions. John was credited with 115 patents. Charles had a total of 35 patents. The latter was characterized by a philosophical type of mind, exploring theoretically the laws of nature. He was often called upon by company associates to solve complicated problems and met with great success. Both men received the Talbot G. Martin award for distinguished service in telephony. The award was made to John in 1936 and to Charles in 1938. The record of their achievement is impressive. Outstanding contributions were made by them in the invention of the dial telephone, the piano wire switch, the automatic selection of an idle trunk, the pay stations for automatic subscriber lines, the preselection of trunk lines, etc. Lundquist applied for more than 100 patents on the automatic telephone. [19]

The pattern of development from the first experiments on the homestead north of Lindsborg until the day of triumph has been described by Charles Erickson as follows:

From that early frosty dawn of March 14, 1893, that brought the hours of parting from the peaceful prairies of Kansas to the momentous day of June 6, 1896, when the finishing touches were put on the most important model ever produced in the automatic telephone field, there were cloudy and stormy days in which [we] pioneered in unexplored grounds of research. But now and again there came a ray of sunlight to inspire new hopes, to encourage [us] to continue to struggle. And the day that served to crown [our] achievement did arrive, the queen of communication, "The Machine Girl," was completed; then to be abused and ridiculed in infancy; now adopted and praised by all nations. [20]

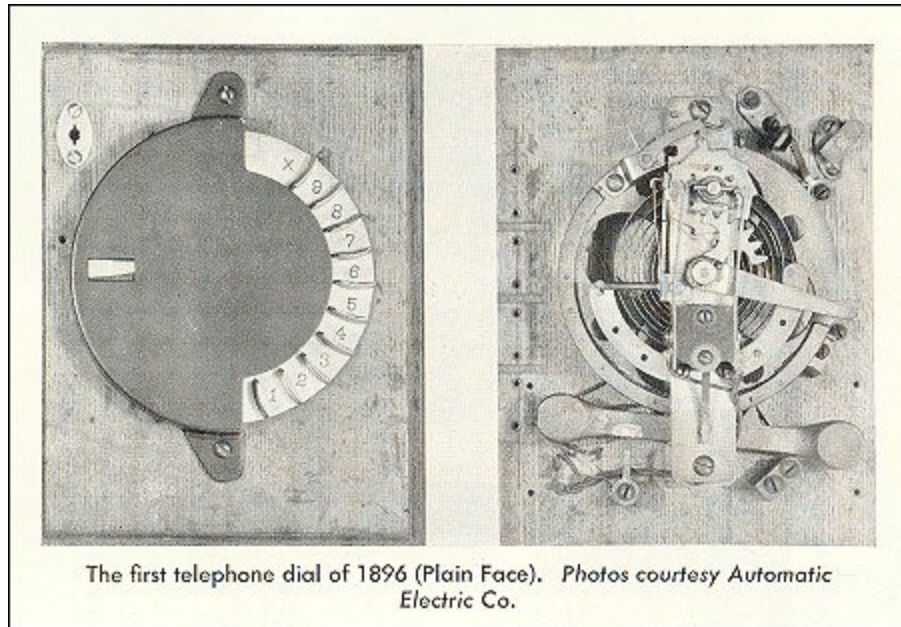
In May, 1951, dial telephone service was installed in Lindsborg by the Southwestern Bell Telephone Company. [21] The grandchildren of the Swedish pioneers became once again the beneficiaries of the vision and energy of an earlier generation. Millions of people throughout the world share daily in the convenience of the dial telephone, which owes so much to the dreams and hopes of these young Kansans in the Smoky valley.

While the pattern of life brought fame to the Erickson brothers in distant places, there was for them across the decades a fond remembrance of the early days in Kansas. Charles described his feelings on the occasion of a testimonial dinner in 1939:

A sheltered nook in the Smoky Valley of Central Kansas today preserves the crumbling and forgotten monument to the model that substituted brains and fingers of iron for the human -- the workshop that cradled the "Machine Girl." Forgotten that monument may be, but there linger therein many and sweet memories of happy days of long ago for two who began their work there. [22]

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## Notes

**Dr. Emory Kempton Lindquist, a former president of Bethany College, Lindsborg, is dean of the faculties at the University of Wichita. He is author of *Smoky Valley People* (1953).**

1. John Erickson was born in Långbanshyttan, Sweden, January 25, 1866. He died on October 18, 1943. Charles J. Erickson was born at Lindsborg on July 23, 1870. He died on September 28, 1954. Frank A. Lundquist was born in Galva, Ill., June 23, 1868. He died on April 6, 1954. Biographical information on the Ericksons is found in *Svenska Nyheter*, Chicago, July 19, 1904.

2. The Anders Ericksons came prior to the 250 Swedes, who immigrated from Värmland in May, 1869, under the leadership of Rev. Olof Olsson. About one-half of the group came to the future Lindsborg community. -- Emory Kempton Lindquist, *Smoky Valley People. A History of Lindsborg, Kansas* (Lindsborg, 1953), pp. 5-16.

3. Letter, Charles J. Erickson to Carl L. Olson, April 2 1932. Lundquist was the son of Mr. and Mrs. N. P. Lundquist, who came to the Lindsborg community from Illinois In 1870.

4. *Ibid.*

5. Lindsborg *News-Record*, July 6, 1923.



6. *Capper's Weekly*, Topeka, July 28, 1923.

7. These early developments are discussed in R. B. Hill's "The Early Years of the Strowger System," *Bell Laboratories Record*, New York, v. 31 (1953), pp. 95, 96; R. B. Hill, "Early Work on the Dial Telephone Systems," *Bell Laboratories Record*, New York, v. 31 (1953), pp. 22, 23. Strowger was a mortician in Kansas City, Mo., before entering the field of telephonic inventions. He left the Strowger Company for reasons of health in 1896. He died in St. Petersburg, Fla., in May, 1902.

8. Charles J. Erickson to Carl L. Olson, April 2, 1932. When Mr. C. M. Candy, chief patent attorney for Associated Electric Laboratories, Inc., presented the Talbot G. Martin award to Charles J. Erickson at Chicago on December 15, 1938, he exhibited an automatic switch made by the Erickson brothers before they came to Chicago in 1893. -- *Telephony Magazine*, Chicago, February 4, 1939, p. 32.

9. Charles J. Erickson to Carl L. Olson, April 2, 1932.

10. Hill, "The Early Years of the Strowger System," loc. cit., p. 96; Hill, "Early Work on Dial Telephone Systems," loc. cit., p. 28.

11. Hill, "The Early Years of the Strowger System," loc. cit., pp. 99, 100.

12. Charles J. Erickson to Carl L. Olson, April 2, 1932.

13. Hill, "The Early Years of the Strowger System," loc. cit., p. 100.

14. *Ibid.*, pp. 98, 99. It is important to identify this basic fact. While the principle of the automatic telephone was known prior to this time, the important invention of the dial telephone, with its unique features, resulted from the patent issued to Keith and the Ericksons.

15. *Telephony Magazine*, February 4, 1939, pp. 32, 33. The first dial telephones were installed at Albion, N. Y., in 1896. -- "The Story of the Automatic Electric Company" (Chicago, N. D., mimeograph), p. 10.

16. John and Charles J. Erickson were the sixth and seventh employees of the original company and its first two development engineers. -- *Telephony Magazine*, February 4, 1939, p. 32.

17. "The Story of the Automatic Electric Company," p. 7.

18. *Telephony Magazine*, February 4, 1939, pp. 32, 33; *Capper's*

*Weekly*, Topeka, July 28, 1923.

19. *Capper's Weekly*, July 28, 1923.

20. Lindsborg *News-Record*, February 2, 1939.

21. *Ibid.*, May 10, 1951.

22. *Ibid.*, February 2, 1939. The small frame building in which the Ericksons worked is located on the farm of Carl O. Pearson northeast of Lindsborg.

